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CHAL-0493
Copy No. 1

26 January 1959

MEMORANDUM FOR: Director of Development & Procurement, DPD-DD/P
(Attention: Major Hippert)

THROUGH : Deputy Director, DPD-DD/P

SUBJECT : Granger Countermeasures Repeater, Mod 504

REFERENCE : Memorandum for DD/P, same subject, dated 14 January 1959 (CHAL-0522)

1. I have read the reference with care and found it most enlightening. I have discussed with [redacted] their stated dissent to the recommendation in paragraph 7.c. As a result of this conversation, I am satisfied that there is no important area of disagreement. All concerned agree that the tests should go forward and that, if the results are sufficiently favorable, the Granger mod 504 should be brought to operational status as rapidly as possible. 25X1

2. Insofar as there is disagreement, it seems to relate to the estimated degree of readiness of the equipment. Since this should be largely a matter of fact rather than of pure judgment, I hope that it will be automatically resolved as tests and development work continue. Obviously, the equipment must be rendered environmentally suitable and must be subject to environmental tests presumably in the form of flight tests to operational altitude. It cannot be operationally installed or employed until the development process is completed. Nevertheless, progress to date has been sufficient in my judgment to justify a re-affirmation of the extremely high priority to be accorded to this development unless and until current tests justify a reversal of the preliminary judgment and rejection of the equipment.

3. With respect to the recommendation in paragraph 7.b. of the reference, I am in full accord that completion of the development and then installation of the present equipment should not be delayed by a search for a higher powered tube. On the other hand, I would like to obtain the best possible judgment on the benefits that might be expected from going to (a) 5 watts and (b) 50 watts, especially since I understand that the use of a higher powered tube in this range would not require any great increase in

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weight. The purpose of arriving at such a judgment is to determine whether we should carry forward the development of a mod 2 version of the Granger mod 1 when available.

4. I will be eagerly awaiting a report of the tests now in progress, of the progress of development, together with recommendations for appropriate further action.

25X1

RICHARD M. BISSELL, JR.
Deputy Director
(Plans)

DD/P:RMB:djm
1-Addressee
2-Dep. Dir. DPD-DD/P
3-Dir of Ops, DPD-DD/P
4-DD/P Chrono
(FU) w/Basic

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CAAL-0534
COPY 1 OF 3

January 15, 1959

MEMORANDUM FOR: [redacted] 25X1

SUBJECT : Test Result

A test of the Granger Box was made on 9 January. Attached is a copy of the test log and [redacted] has a copy of the AI scope-photographs on 16 mm. film. 25X1

This test was favored by an unplanned event. The APG-51B radar in the F3H had been significantly improved through maintenance. The improvement was in the receiver. This improvement (in part of its effect) gave us the equivalence of an increase in the power of the jammer, some 10 db. In other words, we had a 10 watt jammer, in comparison with our previous tests.

The test procedure on this test was to keep the jammer output on at all times. As was expected this resulted in the jammer serving as a beacon. This effect can be stopped shoud a continuous type of operation be desired by programming the jammer so that it would be triggered only on lock-on and shut off only after a period of seconds or minutes after lock-on was broken.

The test created a much greater disturbance to the attacking plane than any previous test. The aiming error was often 25° and averaged some 15° to 20°. These aiming errors continued on into 1/2 a mile of range. Since the Sparrow III is prohibited electronically from being fired unless the aiming error is less than 8°, no firing of the missile would have been possible. No breaks in lock-on occurred. A more sensitive radar receiver would tend to hold lock-on under more unfavorable conditions. In other words, the AI held lock-on better than in earlier tests but this lock-on was of no value to the pilot in aiming or tracking the target.

The pilot stated that he had no opportunity to make a firing on any of the four runs. When asked what he would do if this occurred tohim under action, he said he would come home to get his radar fixed. He was then asked, "What would you do if told to continue the attack as best you could?". He replied that he would go back to the search mode of the radar and try to find the target visually using the search mode (B scan) to guide him. After visual contact he would try an "override" launch by pointing his aircraft as a gun barrel in the general direction and pushing the override button. He was then asked if he thought he could find the target using the B scan to guide him. He said, "Easily when the target is smoking but most likely not if it were not smoking".

The significant results of this test seem to be:

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[redacted]

15 January 1959 25X1

(A). A 10 fold increase in jammer power would produce very much greater confusion for the attacker, so great as to completely nullify the radar as an aiming or tracking device, even if the radar receiver sensitivity is down some 10 db.

(B). If the attacking AI radar receiver is in good operating condition the result of A above will be obtained with the 1 watt jammer.

(C). The errors will continue in to 1/2 mile with either a good radar receiver and a 1 watt jammer or the low sensitivity radar receiver and a 10 watt jammer.

(D). No advantage was gained by the continuous operation of the jammer.

It was agreed that Phase 2 of the testing program was complete. Phase 3 and 4 will now be started. Point Mugu was thanked and informed that we had no further need for their services at this time.

[redacted] 25X1

JFS:bp

Distribution:
Copy 1 [redacted] 25X1
" 2 - Mr. Bissell
" 3 - [redacted] 25X1
" 4 -
" 5 -

SECRET

OP Nº _____

5 PROJECT
A CONTR TEST
B NAVY FLIGHT
C CPI IMPROVE.
D CDT DEVELOP.
N NTE NAVY TÉE
P PRODUCTION MON.
T NTE F8U/F4H/6Q

10 OP Nº FOR DAY

21 COMPLETION
1 LAUNCHED
2 MISSILE TO FIRE BUT "NO-GO"
3 AIRBORNE CAPTIVE
4 INCOMPLETE ON DECK
5 CANCELLED ON DECK PRIOR TO ANY PREP

22 REASON
1 SAT
2 UNSAT
3 AI RADAR
4 READY LITE
5 127/12B
6 MISSILE
7 MISS FIRE
8 BATTERY/EPU
9 OTHER AMCS
A AIRCRAFT
B
C
D DRONE/TGT
H HOLD FIRE
P PROJECT
R RANGE
T TM OR INSTR.
W WEATHER

23 OBJECTIVE
A CONTR SPECIAL
B NAVY SPECIAL
C COUNTERMEASURE
D DELMAR/TGT
E
F FUZE
G GUIDANCE
H HEAT HOME
J JET/HI SPEED
K SEEKER
L LARGE TGT
M MULTIPLE TGT
N
P POWER UNITS
R RADAR
T
W WEATHER

24 SECONDARY
1
2 2 PL CAP.
3
4
5
F FUZE
H HI ALT
L LO ALT
T TRAINING
W WARHEAD

52 PILOTS
B BROWNLEE
E EATON
F FREEMAN
G GITHENS
H HICKMAN
J JOHNSON
M MATTSON
P PROTHRO
S STECKER
V VF PILOT
X VX PILOT

63 RADAR SET-UP
1 SHORT PULSE, NUTATE
2 " NO NUTATE
3 LONG PULSE, NUTATE
4 " NO NUTATE
5 BORESIGHT
6
7
8
9

66 MISSILE
1 NARROW SWEEP
2 WIDE SWEEP

GENERAL CODES
1 SATISFACTORY
2 UNSATISFACTORY
3 NO TEST
X DUPLICATE INFO.

70 ATTACK
1 AIM DOT CENTER
2 UNSAT
3 NO TEST
4 BAD VECTORING

PHASE	PROJECT	MONTH	DAY
S	P	3	59

OP Nº	MISSILE Nº C A P
9	

OBJECTIVE _____

	COMPLETION	REASON	OBJECTIVE	SECONDARY	WARHEAD	C/W RADAR	LAUNCH	GUIDANCE	FUZE	TARGET TYPE	TARGET ALT	TARGET SPEED	INTERCEPTER BU. NO.	INTERCEPTER ALT	INTERCEPTER SPEED	RUN Nº	PILOT	ASPECT	H.B.T SWAP U.D.	ANGLE OFF TGT BOW	ACQUISITION OPPORTUNITY	RADAR SET-UP	DETECTION	MISSILE LOCK-ON	ATTACK	REMARKS
1		3	1	BT						TV	2	00	15	00	08	2	00	34	0	6	G	T		1	80	2	2	1	1	7	3	1	5.0	2	A	I M DOT
1		3	1	BT						TV	20	.0	15	00	08	2	00	34	0	7	G	T		1	80	1	7	1	1	3	3	1	2.0	2	A	I M DOT
1		3	1	BT						TV	2	00	15	00	08	2	00	34	0	8	G	T		1	80	2	2	1	1	7	3	0	0	0	3	NO ATTEMPT
1																																				
1																																				

6. Enable ON Continuous. Lost lock on purpose. Re-contact at 7.0, re-lock at 6.0. Went way off reading at 5.0 miles.
7. Enable ON Continuous. Aim Dot good at start 7 secs. Aim Dot to left at end.
8. Enable ON & OFF every 15 sec. Did not attempt to lock.

OP. Nº 227

5 PROJECT
A CONTR. TEST
B NAVY FLIGHT
C CPI IMPROVE.
D CDT DEVELOP.
N NTE NAVY T&E
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T NTE F8U/F4H/6a

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22 REASON
1 SAT
2 UNSAT
3 AI RADAR
4 READY LITE
5 127/12B
6 MISSILE
7 MISS FIRE
8 BATTERY/CPUL
9 OTHER AMCS
A AIRCRAFT
B
C
D DRONE/TGT
H HOLD FIRE
P PROJECT
R RANGE
T TM OR INSTR
W WEATHER

23 OBJECTIVE
A CONTR. SPECIAL
B NAVY SPECIAL
C COUNTERMEASURE
D DELMAR/TGT
E
F FUZE
G GUIDANCE
H HEAT HOME
J JET/HI SPEED
K SEEKER
L LARGE TGT
M MULTIPLE TGT
N
P POWER UNITS
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PHASE	PROJECT	MONTH	DAY
S	P3	6B	01 09 59

OP Nº	MISSILE Nº CAP
39	CAP

OBJECTIVE Air Force Support

COMPLETION	REASON	OBJECTIVE	SECONDARY	WARHEAD	CW RADAR	LAUNCH GUIDANCE	FUZE	TARGET TYPE	TARGET ALT	TARGET SPEED	INTERCEPTER BU. NO.	INTERCEPTER ALT	INTERCEPTER SPEED	RUN Nº	PILOT	ASPECT H.B.T SNAP U.D.	ANGLE OFF TGT BOW	ACQUISITION OPPORTUNITY	RADAR SET-UP	DETECTION	MISSILE LOCK-ON	ATTACK	REMARKS
1		3	1	B	T			T	V	20	15	000	8	20	34	0	1	6	T		180	1	1	5	3	1	0	0	1	CALIBRATE
1		3	1	B	T			T	V	20	15	000	8	20	34	0	2	6	T		180	1	1	1	3	3	0	0	0	3	NO ATTEMPT
1		3	1	B	T			T	V	20	15	000	8	20	34	0	3	6	T		180	1	1	1	3	3	1	2	0	2	AIM DOT
1		3	1	B	T			T	V	20	15	000	8	20	34	0	4	6	T		180	1	1	1	3	1	0	0	2	AIM DOT
1		3	1	B	T			T	V	20	15	000	8	20	34	9	5	6	T		180	1	1	1	5	3	1	4	0	1	CALIBRATE

1. Enable Off. Turn at Locks.
2. Enable ON & OFF every 15 sec. after CONTACT. Did not attempt to lock. Had weak Contact then got large. Went 10° weave. Recorders late.
3. Enable ON continuous. Did not follow Aim Dot because it was so erratic. Only had one chance to fire. Recorders late.
4. Enable ON continuous. Erratic dot.
5. Enable OFF.